

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO	
RAD: 14-48637- -5	FECHA: 2016-03-15 10:05:19
DEP: 2020 DIRECCION DE NUEVAS CREACIONES	EVE: 1 REGISTRO/DEPOSITO/CONCESION/DEPOSITO
TRA: 2 PATENTES DE INVENCION	FOLIOS: 6
ACT: 519 TRASLADOINFORME	

DIRECCIÓN DE NUEVAS CREACIONES

2020
Bogotá, D.C.,

Abogado(a)/Señor(a)
ANDRÉS MÁRQUEZ ACOSTA

Asunto: Radicación: 14-48637- -5
Trámite: 2
Evento: 1
Actuación: 519
Oficio: 2751
Folios: 6

Patente de Invención	X			Patente de Modelo de Utilidad	
Vía Nacional	X				
Vía PCT (Fase Nacional)		Capítulo I		Capítulo II	
No. Solicitud Internacional					
Fecha de Presentación Internacional					

Como resultado del examen de fondo realizado, con fundamento en el Artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se comunica:

1. Documentos estudiados

Descripción:	Rad. N° 14-048637-00000-0000	07/marzo/2014
Reivindicaciones:	Rad. N° 14-048637-00000-0000	07/marzo/2014
Dibujos:	Rad. N° 14-048637-00000-0000	07/marzo/2014

2. Objeto de la invención

De acuerdo con lo establecido en el numeral 1.2.2.2 del Capítulo Primero del Título X de la Circular Única para efectos del examen de patentabilidad, se tendrá en cuenta la tasa pagada por el solicitante al momento de comenzar el examen para las reivindicaciones adicionales; esto es que cuando la solicitud contenga más de diez (10) reivindicaciones y no se haya pagado la tasa complementaria, sólo se estudiarán las cubiertas por la tasa pagada. Por lo tanto sólo se

estudiaran las reivindicaciones 1 a 10 del capítulo reivindicatorio (Radicado N°.14-048637-00000-0000).

Título de la solicitud: “Sistema dosificador de resina líquida para mezclas secas de material de fricción y proceso para la fabricación de dicho material de fricción” (Pág. 1, radicado N° 14-048637-00000-0000).

El problema planteado en esta solicitud consiste en la necesidad de desarrollar sistemas mejorados que realicen la dosificación adecuada de resina líquida en la elaboración de bloques de freno, con el cual se pueda mezclar materiales reciclados con materias primas nuevas, con el fin de reducir costos y evitar la contaminación.

Para resolver este problema técnico, la solicitud en estudio proporciona un sistema y método para fabricar bloques de freno, en donde el sistema comprende una boquilla, un mezclador, un tanque de calentamiento, válvulas neumáticas, bombas y agitador. En donde el método comprende calentar la resina y el solvente, adicionar fibras de asbesto, adicionar aditivos, dosificar la resina, airear la mezcla, prensar en frío y en caliente, recortar la teja, curar los bloques y rectificar.

El objeto de la presente solicitud se relaciona con la Clasificación Internacional de Patentes (CIP): B67D 7/00 AC; C08G 85/00.

3. Cambio de Modalidad (Art 35)

Se acepta la conversión de la solicitud: de patente de modelo de utilidad a invención a patente de invención.

4. Descripción (Art 28 D 486)

La descripción no divulga la invención de manera suficientemente completa para que el la persona del oficio normalmente versada en la materia pueda ejecutarla (ó reproducirla). La solicitud presenta términos generales como por ejemplo: “resina”, “rectificar”, “revisar”, sin que se especifique el tipo de resina a ser dosificada inicialmente o el tipo de revisión que se realiza al producto final. Por otro lado, se encuentra que tampoco se presenta pruebas o ensayos realizados a la pastilla con los cuales se compara con pastillas del estado del arte, y con los cuales se busque demostrar el efecto técnico logrado con la formulación, sin que se vea afectados los requerimientos normativos.

Se requiere a la solicitante hacer las aclaraciones necesarias.

5. De la solicitud de patente

Reivindicaciones (Art 30 D 486, Art 22 PCT)

- En las reivindicaciones 2, 7, los términos y/ frases: “en caso de ser necesario”, “materia prima”, “de acuerdo con la formulación”, “materia

prima”, “*adicionar fibras de asbesto*”, “*grafitos, óxidos, caucho, resinas fenólicas sólidas y material reciclado*”, “*dosificar*”, son escritos de carácter general y sugieren de forma imprecisa que la protección se extiende a otras posibles variaciones o modificaciones, se sugiere realizar las modificaciones respectivas utilizando términos que describan de forma menos general o definir claramente los rangos.

- La reivindicación 8 presenta una falsa dependencia por cuanto refieren un proceso, sin embargo, depende de la reivindicación del sistema, lo cual no es permitido, se le recuerda a la solicitante que las reivindicaciones dependientes son particularidades de la reivindicación independiente de la cual depende, sin embargo, en el caso en mención refieren métodos, no considerándose especialidades de la reivindicación 1.

6. Determinación del Estado de la Técnica

El estado de la técnica se determinó con base en la fecha de presentación de la solicitud de prioridad: marzo 07 de 2014 y se encontraron los siguientes documentos que anticipan el objeto de esta solicitud:

Ítem	Documento	Título	Fecha de Presentación*
D1	US3,402,054	“Friction material”	17/septiembre/1968
D2	US4,831,067	“Process for the manufacture of frictional elements and frictional elements produced thereby”	16/mayo/1989

El documento D1¹ divulga materiales de fricción como forros de freno, pastillas de frenos, forros de embrague o zapatas de freno de ferrocarril que se hacen comúnmente de amianto o de otras fibras inorgánicas y otros ingredientes que pueden incluir caucho, polvos metálicos, materiales de carga minerales, polvos de caucho curado, grafito, antioxidantes y lubricantes (resumen).

El documento D2² divulga esta invención se refiere a elementos de forma de fricción, en particular de forros de frenos, pastillas de freno y forros de embrague y a un método de fabricación de la misma, que implica el uso de resinas fenólicas de líquido y catalizador fijados a temperatura ambiente (resumen).

Examen de Patentabilidad (Art 14 D486)

Nivel Inventivo (Art18 D486)

La reivindicación 7 consiste en “*Un proceso para la fabricación de mezclas de fricción o bloques de freno...*” (Ver página 18 del radicado N° 14-048637-00000-0000).

¹<https://docs.google.com/viewer?url=patentimages.storage.googleapis.com/pdfs/US3402054.pdf>

²<https://docs.google.com/viewer?url=patentimages.storage.googleapis.com/pdfs/US4831067.pdf>

Comparación de las características técnicas **esenciales**, con las del Estado de la Técnica:

Características Esenciales	D1	D2
Un proceso para la fabricación de mezclas de fricción o bloques de freno (...) caracterizado por que comprende:	Un método para elaborar un material de fricción según la reivindicación1 (reivindicación 7)	Un método para la fabricación de un elemento de fricción (reivindicación 1).
Pesar la materia prima de acuerdo con la formulación;	Una resina es comúnmente añadido a la mezcla para actuar como aglutinante (Col.1, líneas 38 y 39)	Se agito vigorosamente durante 30 segundos (Ej.1).
Calentar con agitación a 80°C una mezcla de resina y el thinner para luego inyectar en el mezclador		
Adicionar fibras de asbesto;	Ejemplo.1 la composición incluye fibras de asbesto	No menciona
Luego de 6 minutos, adicionar los grafitos, óxidos, caucho, resinas fenólicas sólidas y material reciclado;	Se hacen comúnmente con otros ingredientes, polvos de caucho, grafito, antioxidantes y lubricantes (Col.1, líneas 34 a 40).	En particular otros elementos son polvo de cobre, grafitos, lana de hierro, polvo de hierro, etc, (Col.3, líneas 1 a 3).
Aírear la mezcla durante 10 minutos para ayudar a la vaporización del solvente;		
Depositar la mezcla resultante en un carro transportador;		
Prensar en frio el material luego de ser transportado;	No menciona	Se coloca en un molde pastilla de disco a temperatura ambiente (20°C) en una prensa (Ej.1).
Prensar en caliente el material a una temperatura a 140°C a una presión de 3500 psi	Las condiciones de temperatura y presión pueden variar bastante (Col.2, líneas 49 y 50)	La acción del calor desde el molde es primero para fundir el aglutinante y después curar (Col.1, líneas 18 y 19).
Recortar la teja de material en un ancho de acuerdo con la referencia deseada y en el largo deseado, en caso de ser necesario;	No menciona	No menciona
Curar los bloques recortados a una temperatura de 170°C por 72 minutos;	El curado puede llevarse a cabo bajo una presión de 2 a 20 toneladas por pulgada cuadrada en el intervalo de temperatura de 80 a 220°C (Col.2, líneas 56 a 60).	Estas pastillas se curaron durante 16 horas a 200 °C (Col.4, líneas 45 y 46).
Rectificar los bloques externamente según la referencia e internamente según corresponda; revisar cada uno de los bloques obtenidos; y empacar y almacenar el producto, según sea necesario.	No menciona	No menciona

El documento D1 se considera el estado de la técnica cercano a la invención definida en la reivindicación 7 porque divulgan un método para elaborar elementos de fricción (...) (resumen).

La diferencia entre la invención, definida en la reivindicación 7 y el método de D1 consiste en que este último no divulga específicamente los pasos de prensar en frio, recortar el materia y rectificar.

El efecto técnico que se logra los pasos de prensar en frio, recortar el material y rectificar es lograr tener elementos de fricción de acuerdo a las especificaciones establecidas.

Por lo tanto, el problema técnico objetivo que pretende resolver esta invención se puede formular así: “¿Cómo modificar el método divulgado en D1 de tal manera que se logren elementos de fricción con especificaciones establecidas”.

Sin embargo, ya era conocido en el estado de la técnica procesos de formación de elementos de fricción donde se incluye el paso de prensado en frío, ya que el documento D2 divulga el paso de colocar la mezcla en un molde de pastilla de disco a temperatura ambiente (20°C) en una prensa (Ej.1). Por otro lado, es del conocimiento del técnico medianamente versado en la materia, que el proceso de fabricación de pastillas de freno es un proceso estandarizado en donde las variables de dicho proceso las define el fabricante en función del tipo de materiales que emplea, es decir de la composición que defina, sin embargo, los principales pasos son: el proceso de mezclado, prensado en caliente, curado, escorchado, operaciones de mecanizado, puesta de accesorios, marcado y estuchado (Cáp.4, Ítem 3. Fabricación)³, así mismo, el paso de rectificar y revisión de las pastillas⁴.

En consecuencia, la persona del oficio normalmente versada en la materia, enfrentada al problema objeto de cómo lograr elementos de fricción con especificaciones establecidas, estaría motivada a prensar a temperatura ambiente la mezcla conocido en D2 y a incluir los pasos estandarizados para la elaboración de pastillas de freno en el método divulgado en D1 para llegar a la materia reivindicada, por tanto, se considera que la solución de la reivindicación 1 carece de nivel inventivo.

Las reivindicaciones 8 a 10 no contienen materia que puedan brindarle altura inventiva al método ya que en procesos de fabricación de pastillas de freno es un proceso estandarizado, en donde las variables del proceso las define el fabricante en función del tipo de materiales que emplea, por tanto, el técnico medianamente versado en la materia estaría motivado a realizar ensayos de rutina para llegar al método y aplicación con las condiciones mencionadas. Cabe decir, que la solución anterior se encuentra dentro de un proceso de optimización⁵, lo cual se encuentra dentro de la práctica habitual de la persona versada en la materia que trabaje en el campo técnico específico.

7. Conclusión

Los requisitos de Patentabilidad de la presente Solicitud están afectados así:

Ítem	Documento	Reivindicaciones afectadas	Requisito que afecta
D1	US3,402,054	7 a 10	Nivel Inventivo
D2	US4,831,067	7	Novedad y Nivel Inventivo

3Manual Técnico de la pastilla de freno. Capítulo 4 Pastilla de freno. 3, Fabricación. 30 marzo de 2012.
<http://www.imporbrake.com/manuales/Cap4.pdf>

4Directo de Fábrica. Visitamos la fábrica de Fimpex, pastillas de freno-Dossier. Publicado 4 de junio de 2013.
https://www.youtube.com/watch?v=D_QLS52DeAw&ebc=ANyPxKohCeEX9owKzjvF2J-mmKhUstv-t1ZIUEbbUj_QANnFPxmzBKH_SGjdRfI6mdzeB2QJ70zkiW6Mfv-jwCDpgYE_USWB4A

5 Perry Manual del Ingeniero Químico. Tomo I. Sección 2. Sexta edición. 1992.

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta (60) días contados a partir del día siguiente de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Si como respuesta a este requerimiento el solicitante llegara a modificar: i) el capítulo reivindicatorio, ii) la descripción de la invención a proteger, iii) o presente un nuevo capítulo reivindicatorio, no deberá pagar la tasa de modificación voluntaria pero sí la correspondiente a la tasa de examen de patentabilidad para que se estudie la materia modificada. En todo caso, el número de requerimientos por no patentabilidad estará supeditado a que el término del estudio de patentabilidad no sea superior a 18 meses, contados desde la publicación de la solicitud de patente de invención. Adicionalmente, se le recuerda al solicitante que si como respuesta a este requerimiento llegara a modificar el capítulo reivindicatorio y éste contenga más de diez (10) reivindicaciones deberá pagar la tasa por reivindicación adicional.

Se invita al solicitante se sirva indicar, si así lo considera, su renuncia al término faltante de sesenta (60) días para dar respuesta a este requerimiento y presentarla por escrito.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única No. 10 de 2001.



JOSÉ LUIS SALAZAR LÓPEZ
Director de Nuevas Creaciones (c)

El anterior requerimiento fue notificado por fijación en lista, de fecha 2016-03-22

Elaboró: Olga Ximena Benavides Salazar
Revisó: Rachid Ponce Vergel

PatBase - Search results 08 March 2016

Search query (2): [SP]: background of the invention1. field of the inventionthe invention broadly relates to friction materials which comprise an inorganic fiber and a binder substantially wholly composed of a metallic sulfide formed in situ.2. description of the prior artfriction materials used as brake linings, disc brake pads, clutch facings or railway brake blocks are commonly made under suitable conditions of temperature and pressure from asbestos or other inorganic fiber and other ingredients which may include rubber, metallic powders, mineral fillers, cured rubber powders, graphite, rubber-curing ingredients, antioxidants and lubricants. a binder is always present, and a resin is commonly added to the mix to act as a binder. rubber itself will act as a binder, and rubber and resin may be present together vegetable oils can also be used as binders, again with or without rubber.friction materials containing conventional organic binding agents exhibit poor frictional stability under varying temperature conditions. considerably higher temperatures are generated in disc brakes than in drum brakes, with the result that organically-bound friction materials are more likely to disintegrate the thermal degradation of such binders results in inferior frictional characteristics, giving rise to fade and often resulting in increased wear. furthermore, organic materials, particularly resins, tend to have a short shelf life, and are not always easy to reproduce.in an attempt to overcome the deleterious effects of poor thermal resistance in a friction material having an organic binder, various sintered metal and ceramic materials in which the sintering effects the bonding have been developed. however, sintering is normally a high-temperature process, and may, for example, be carried out at temperatures in excess of 750 degrees c, necessitating the use of controlled or conditioned atmospheres and other complicated manufacturing techniques.summary of the inventionit has been found that a friction material comprising an inorganic fiber, such as asbestos, and a binder substantially wholly composed of metallic sulfide formed in situ will exhibit enhanced frictional stability under varying temperature conditions.the metallic sulfide generally consists of iron sulfide formed by the reaction of sulfur with iron powder, or with a lower iron sulfide. copper sulfide, formed by the reaction of sulfur with copper powder or with cuprous sulfide, may also be present.it is critical that the binder be formed in situ.additional materials such as metallic powders, fillers, antioxidants and friction modifiers may be included in the friction material.a process for forming the friction material comprises compacting and curing a mixture of ingredients which contains sulfur with iron powder or a lower iron sulfide. optionally, copper powder or cuprous sulfide may be present.the curing may be carried out under a pressure of from 2 to 20 tons per square inch at a temperature in the range of from about 80 degrees centigrade to about 600 degrees c, depending on the proportions of the sulfides in the binder.description of the preferred embodimentsaccording to the invention, the binder is wholly or substantially wholly composed of metallic sulfide formed in situ, the metallic sulfide consisting of iron sulfide formed by reaction of sulfur with iron powder or with lower iron sulfide, with or without copper sulfide formed by reaction of sulfur with copper powder or with cuprous sulfide. the copper sulfide binder may thus be cupric or cuprous sulfide if a cupric sulfide binder dissociates after being formed the resultant cuprous sulfide still acts as a binder.iron and sulfur form a wide range of compounds with non-stoichiometric formulas, apart from the two defined sulfides fes and fe 2 s 3. in this specification we refer to any such compounds as iron sulfides, whether they have a well-defined formula or not. at the same time, we classify as lower iron sulfides those iron sulfides which are capable of reacting with further sulfur to form higher valency state iron sulfides.iron sulfide may form the sole binder in the friction material, or the binder may be formed partly of iron sulfide and partly of copper sulfide. a friction material formed from asbestos or other inorganic fiber with fillers and friction modifiers will normally require a content of at least 10 percent by volume of binder calculated as metal sulfide. this figure is dependent to a certain extent on the content of inorganic fiber or of other constituents, but will usually give a satisfactory material. the proportion of metal sulfide may, of course, be increased, but any metal sulfide in excess of about 50 percent by volume is no longer acting as a binder, but as a filler. the friction material may also contain other conventional additives, for example metallic powders such as lead, tin, brass and aluminum, fillers such as barytes, rottenstone-whiting, carbon black and organic materials, and friction modifiers, such as graphite, alumina, silica and metal oxides. inorganic fibers other than asbestos include glass fibers and metallic fibers.we prefer to form the iron sulfide binder from iron powder and sulfur. the ratio of iron to sulfur may be varied over wide ranges, the preferred limits being iron to sulfur of 4:1 to 1:11/2 by weight. any iron powder or sulfur which is not combined as iron sulfide will be present as a filler, and the presence of uncombined iron or sulfur in the friction material may even be advantageous. when copper sulfide forms part of the binder, the presence of uncombined copper in the friction material may similarly be advantageous.iron is cheaper than copper, but on the other hand does not react so readily with sulfur, so that the curing temperature must be raised accordingly. the properties of the finished friction material are comparable, whether the binder is solely iron sulfide or is a mixture of iron and copper sulfides and so the choice of proportions can be selected to suit any given circumstances. curing times for a friction material in which iron sulfide is the sole binder sulfide are preferably from one-half minute upwards at pressures of from 2 to 20 tons/in 2 and temperatures of from 300 degrees to 600 degrees c if the binder also contains copper sulfide, then curing temperature may be less than 300 degrees c, even down to as low as 80 degrees c, depending on the relative proportions of iron sulfide and copper sulfide. the times, temperatures and pressures are, of course, interdependent, but in general the curing times will not exceed 10 minutes.in general friction materials according to the invention will contain from 15 to 50 percent by volume of asbestos or other inorganic fiber, and the fibers most commonly used are those of grades 5 and 7. the asbestos or other fiber and metallic sulfide binder together will normally constitute at least 25 percent by volume of the friction material, the content by volume of fillers, lubricants or other additives thus being from 0 to 75 percent.two examples will now be given (all parts being by weight):example 1the following ingredients were mixed together, and disintegrated through an 1/8-inch-mesh screen.ingredient parts
iron powder 29 sulfur 16.5 graphite 18.8 asbestos fiber (grades 5 and 7) 21.3 silica 10.4 alumina 4.0
the mixture was then cold compacted, and cured for 8 minutes at a pressure of 2 tons/in 2 and a temperature of 600 degrees c.example 2the following ingredients (with exception of the copper powder) were mixed together, disintegrated through an 1/8-inch-mesh screen, and then spread in shallow pans to cool.ingredient parts
iron powder 14.5 copper powder 14.5 sulfur 16.5 graphite 18.8 asbestos fiber (grades 5 and 7) 21.3 silica 10.4 alumina 4.0
the copper powder was then mixed in, the mixture cold-compactd, and cured for 5 minutes at a pressure of 2 tons/in 2 and a temperature of 450 degrees c.in forming the mixture of ingredients, all the constituents except for any copper or cuprous sulfide are mixed and disintegrated. the mixture may then be spread out in shallow trays to cool, and allowed to stand for 24 hours in order to eliminate the fire risk which would arise if finely divided materials, warmed by the mixing step, were stored in containers. any copper powder or cuprous sulfide may then be added and the materials mixed for a further 10 minutes. if copper powder or cuprous sulfide were mixed in initially, there would be a danger of sufficient heat being generated in the disintegration step to initiate the exothermic reaction between the sulfur and copper or cuprous sulfide.after the initial mixing step, the product may be left for as long as required. however, once copper powder or cuprous sulfide has been added, it is desirable that the mixture be cured as soon as possible because its flow characteristics tend to deteriorate.the friction characteristics of the materials of examples 1 and 2 were tested in a disc brake system on an inertia dynamometer using an automobile disc brake caliper and a cast iron braking disc 93/4 inches in diameter and one-half inch thick. two friction buttons formed from the material were placed in the caliper opposite each other on opposite sides of the braking disc. the tests were designed to simulate normal usage of automobile brakes, two sets of conditions being used as follows:test (a): 300 applications of the brake were made, 2

Results: 16

Search history

Search 1: PN=(us3402054) (Results 1)

Search 2: [SP]: background of the invention1. field of the inventionthe invention broadly relates to friction materials which comprise an inorganic fiber and a binder substantially wholly composed of a metallic sulfide formed in situ.2. description of the prior artfriction materials used as brake linings, disc brake pads, clutch facings or railway brake blocks are commonly made under suitable conditions of temperature and pressure from asbestos or other inorganic fiber and other ingredients which may include rubber, metallic powders, mineral fillers, cured rubber powders, graphite, rubber-curing ingredients, antioxidants and lubricants. a binder is always present, and a resin is commonly added to the mix to act as a binder. rubber itself will act as a binder, and rubber and resin may be present together vegetable oils can also be used as binders, again with or without rubber.friction materials containing conventional organic binding agents exhibit poor frictional stability under 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 10.4 alumina 4.0
 a pressure of 2 tons/in 2 and a temperature of 600 degrees c.example 2the following ingredients (with exception of the copper powder) were mixed together, disintegrated through an 1/8-inch-mesh screen, and then spread in shallow pans to cool.ingredient parts
 iron powder 14.5 copper powder 14.5 sulfur 16.5 graphite 18.8 asbestos fiber
 (grades 5 and 7) 21.3 silica 10.4 alumina 4.0
 the mixture cold-compacted, and cured for 5 minutes at a pressure of 2 tons/in 2 and a temperature of 450 degrees c.in forming the mixture of ingredients, all the constituents except for any copper or cuprous sulfide are mixed and disintegrated. the mixture may then be spread out in shallow trays to cool, and allowed to stand for 24 hours in order to eliminate the fire risk which would arise if finely divided materials, warmed by the mixing step, were stored in containers. any copper powder or cuprous sulfide may then be added and the materials mixed for a further 10 minutes. if copper powder or cuprous sulfide were mixed in initially, there would be a danger of sufficient heat being generated in the disintegration step to initiate the exothermic reaction between the sulfur and copper or cuprous sulfide.after the initial mixing step, the product may be left for as long as required. however, once copper powder or cuprous sulfide has been added, it is desirable that the mixture be cured as soon as possible because its flow characteristics tend to deteriorate.the friction characteristics of the materials of examples 1 and 2 were tested in a disc brake system on an inertia dynamometer using an automobile disc brake caliper and a cast iron braking disc 93/4 inches in diameter and one-half inch thick. two friction buttons formed from the material were placed in the caliper opposite each other on opposite sides of the braking disc. the tests were designed to simulate normal usage of automobile brakes, two sets of conditions being used as follows:test (a): 300 applications of the brake were made, 2 (Results 16)

Search 3: PN=(us4831067) (Results 1)

Search 4: [SP]: background of the inventionthis invention relates to shaped frictional elements, particularly brake linings, disc pads and clutch facings and to a method of manufacturing the same which involves the use of liquid phenolic resins and catalyst set at room temperature.in the conventional process for the manufacture of shaped frictional elements fillers such as asbestos fibres, barytes, magnesias brass or zinc filings or turnings are mixed with a binder comprising a powdered phenol formaldehyde novolak/hexamine blend and hot pressed in a mould. the action of the heat from the mould is first to fuse the binder and then to cure it.it is, however, a disadvantage of this process that noxious gases and fumes of ammonia, formaldehyde and free phenol are evolved during the curing process. the workers need to wear gloves in order to handle the ejected cured mouldings and generally the conditions of work are very unpleasant.it is a further disadvantage of the conventional process for the production of shaped frictional products that the expenditure of considerable energy is necessary to effect the fusion and setting of the binder.it is known to accelerate the cure of these materials by the addition of acids or anhydrides. many frictional materials, such as asbestos, are, however, alkaline while many of the metals included in frictional materials, while not alkaline, nevertheless react with acids. in this way much, if not all, of the accelerating effect of acids and anhydrides is vitiated when these materials are employed in an attempt to accelerate phenolic resins in bonding frictional compositions. in addition, the presence of acids is undesirable for a number of other reasons, such as their corrosive effect on metals, both in manufacture and use, and the additional handling problems, environmental effects and health risks which their use entails.the present invention seeks to improve these aspects of production by eliminating the heat curing steps during formation of the shaped frictional materials. the reduction in energy brought about by cold curing is a substantial economic advantage of the system but there is also a reduction in wear on the moulding tool and the need for extensive ventilation is eliminated.we have now found that shaped frictional articles can be produced quickly and economically at room temperature, without the hazards and inconveniences associated with heated moulds, by a process in which an aqueous highly alkaline phenol-formaldehyde condensation product is employed as a binder, said binder is intimately mixed with a quantity of frictional filler and subsequently with a second quantity of frictional filler which has previously been mixed with a quantity of a liquid ester sufficient to effect cure of the phenolic resin.these compositions set at room temperature and therefore demand less energy than the heat cured systems previously used. the low curing temperature results in the substantial elimination of noxious fumes and the hazards associated with the handling of heated moulds. being free from acidic materials, corrosion problems are greatly reduced or eliminated. in addition, because they are catalyzed by alkalies, they set in the presence of alkaline fillers such as asbestos.summary of the inventionaccordingly the present invention comprises a method for the manufacture of shaped frictional elements which comprises mixing frictional filler with from 5 percent to 30 percent of a liquid, alkaline, phenol-formaldehyde resin having a formaldehyde to phenol molecular ratio between 1:1 and 3.5:1, a weight average molecular weight between 300 and 4000 and a ph greater than 10, mixing a second portion of the same or a different frictional filler with a liquid ester curing agent for the phenol-formaldehyde resin, intimately mixing the two portions together and allowing the resultant mixture to cure in a mould.the invention also comprises a composition suitable for the manufacture of brake linings, pads and clutch facings which comprises a major proportion of frictional filler or a mixture of frictional fillers, from 5 percent to 30 percent of a liquid, alkaline, phenol-formaldehyde resin with a formaldehyde to phenol molar ratio between 1:1 and 3.5:1, a weight average molecular weight of from 300 to 4000 and a ph value above 10 and from 10 percent to 110 percent on the weight of the resin of an ester as catalyst therefor.the invention further comprises a shaped frictional article produced by the above process.detailed description of the inventionliquid alkaline phenol-formaldehyde resins suitable for use in the present invention are those in which the formaldehyde to phenol ratio is within the range 1:1 to 3.5:1 and preferably within the range 1.5:1 to 2.2:1.the alkali used may be sodium hydroxide or potassium hydroxide or a mixture of these with alkaline earth oxides such as calcium hydroxide, barium, oxide, magnesium oxide, etc. we have found that potassium hydroxide gives the best performance.the proportion of alkali in the composition may vary with the molar ratio of formaldehyde to phenol, the molecular weight of the resin, the nature of the alkali and the nature of the frictional material employed but must be sufficient in quantity and nature to impart to the resin a ph value above 10. preferably the resin will have a ph value of 11 to 13. this can normally be achieved using an alkali to phenol ratio within the range from 0.1:1 to 5:1. it will be obvious to those skilled in the art to adjust the quantity of alkali to obtain satisfactory results and this may be necessary to compensate for the effects of the frictional components employed.the weight average molecular weight (mw) of the resin must be high enough to allow gelation to occur, i.e., above 300. on the other hand, both storage stability and final strengths will tend to fall with increase in molecular weight and products with molecular weights in excess of 4000 (mw) are generally unsuitable. the preferred products are those with molecular weights within the range 600 to 1700 (mw).if desired, the solids content of the resin may be adjusted, for example, by distillation, but this is not usually necessary and the savings in time and energy thereby achieved constitute a further advantage of the invention.the frictional fillers employed in the present invention may be any of the fillers normally employed in the brake lining industry for the production of linings, pads, clutch facings, etc. of particular interest are the non-asbestos fillers: copper powder, iron wool, iron powder, friction dust, graphite, barytes, etc., since they are becoming more widely used as the industry changes away from asbestos for environmental pollution reasons. another suitable filler is kevlar (trademark of dupont) polyaramide fibers. the alkaline phenolic resins do not react with fillers of this nature.the curing catalyst used in the invention is an ester. suitable esters include low molecular weight lactones, e.g., gamma butyrolactone, propiolactone, valerolactone and caprolactone, and esters of short and medium chain (e.g., c1-c10) fatty acids with aliphatic mono- or polyhydroxy alcohols of chain lengths c1-c10.the amount of catalyst used can be as low as 10 percent and as high as 110 percent of the liquid resin depending upon the molecular weight of the ester and the degree of acceleration required. preferably the amount of ester is from 15 percent to 40 percent by weight of the weight of liquid resin solution used.a silane is preferably included in the phenolic resin to promote adhesion to the frictional fillers and thus increase the strengths of the final cured frictional element. amounts as low as 0.05 percent by weight of the weight of liquid resin have some effect, while little, if any, additional strength is gained from the addition of amounts in excess of 5 percent. consequently, we prefer to employ a silane in an amount between 0.50 percent and 5 percent on the weight of the liquid resin and an amount between 0.2 percent and 1.5 percent is found to be particularly effective.although gamma aminopropyl triethoxy silane is the preferred material, other silanes may be substituted either wholly or in part.the following examples illustrate the present invention.manufacture of phenol formaldehyde resin solution a94 grams of 100 percent phenol were dissolved in 67.3 grams of a 50 percent aqueous solution of potassium hydroxide. the solution was heated to reflux and 120 grams of 50 percent aqueous formaldehyde, corresponding to a phenol:formaldehyde molar ratio of 1:2, were added slowly, while maintaining reflux. the reaction mixture was maintained under reflux until it attained a predetermined viscosity corresponding to a weight average molecular weight of 1400. the resin solution was cooled to 40 degrees c. and 0.4 percent by weight on the weight of the resin solution of gamma-aminopropyl triethoxysilane added.manufacture of phenol formaldehyde resin solution b94 grams of 100 percent phenol were dissolved in 85.3 grams of a 50 percent aqueous solution of potassium hydroxide. the solution was heated to reflux and 96 grams of 50 percent aqueous formaldehyde, corresponding to a phenol:formaldehyde molar ratio of 1:1.6, were added slowly, while maintaining reflux. the reaction mixture was maintained under reflux until it attained a predetermined viscosity corresponding to a weight average molecular weight of 1500. the resin solution was cooled to 40 degrees c. and 0.4 percent by weight on the weight of the resin solution of gamma-aminopropyl triethoxysilane added.testing of resins(a) viscosity--measured using an oswald (u-tube) viscometer at 25 deg(b) solids content--measured by heating a weighed sample (2.0+-.0.1 g) in an air (Results 99)

Search 5: 2 y 4 (Results 113)

Search 6: 2 and 4 (Results 0)

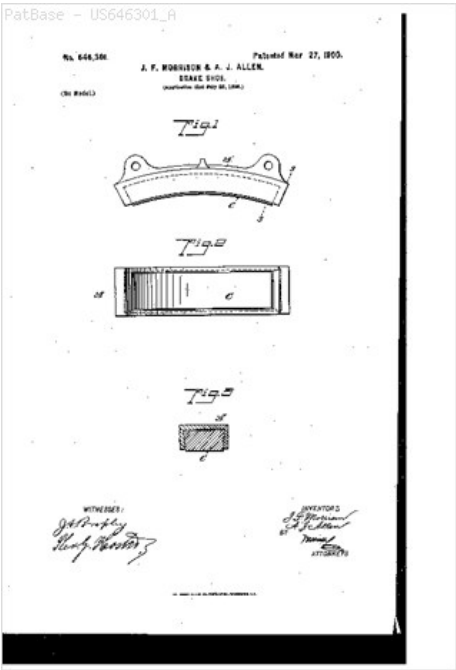
Search 7: resin and solvent and cure* and press* and grind/ (Results 0)

Search 8: resin and solvent and cure* and press* (Results 3873)

Search 9: 4 and 8 (Results 2)

Title: BRAKE-SHOE.

Classifications:
International (IPC 1-7): B62C7/00
CPC: F16D69/022
US: 106/275 106/36



Family:

Publication number	Publication date	Application number	Application date
US646301 A	19000327	US18990725108	18990725

Priority:

US18990725108 18990725

Probable Assignee: ALLEN ANDREW JACKSON
Assignee(s): (std): ALLEN ANDREW JACKSON ; MORRISON JAMES FRANCIS
Assignee(s): ANDREW JACKSON ALLEN ; JAMES FRANCIS MORRISON
Inventor(s): (std): ALLEN ANDREW JACKSON ; MORRISON JAMES FRANCIS
Inventor(s): ANDREW JACKSON ALLEN ; JAMES FRANCIS MORRISON

Title: Friction material and method of making same

Abstract: Source: US2252991A I claim as my invention: 1. A friction element composed of major proportions by weight of fibrous asbestos and oxidation products of iron in binding relationship therewith. 2. A friction element composed of major proportions by weight of fibrous asbestos and the corrosion products of iron as the essential binder thereof. 3. A friction element composed of major proportions by weight of asbestos and iron in the form of its oxidation products formed in situ and comprising the essential binder thereof. 4. A friction element composed of major proportions by weight of asbestos and iron in the form of its oxidation products formed in situ and comprising the essential binder thereof, the said element having a coefficient of friction of from approximately 0.15 to 0.60. 5. A friction element composed of major proportions by weight of fibrous asbestos and particles of iron, the said iron particles being substantially completely in the form of oxides formed in situ and in binding relationship in said element. 6. A friction element composed of major proportions by weight of fibrous-asbestos and powdered iron and a minor proportion of sulphur, the said iron being substantially completely in the form of oxides thereof and in minor proportion in the form of iron sulfite formed in situ, the said conversion products of iron comprising the essential binder for said element. 7. A friction element composed of major proportions by weight of fibrous asbestos and particles of iron, and minor proportions of sulfur and an electrolyte, the said iron being substantially completely in the form of its oxidation products formed in situ a pre-shaped element and comprising the essential binder thereof. 8. A friction element comprising essentially asbestos, a friction modificant material and as the predominant binder thereof oxidation products of iron. 9. A friction element comprising essentially asbestos and a predominant binder consisting of the oxidation products of iron, and a secondary binder. 10. A friction element comprising essentially asbestos and a predominant binder consisting of the oxidation products of iron, and a secondary organic binder. 11. A method of making friction material suitable for clutch facings, brake linings and the like, which comprises intimately mixing and shaping into the form of a friction element a composition comprising essentially asbestos and particles of iron, and thereafter inducing oxidation to substantially completely convert the compounded iron to its oxides in situ said shaped element. 12. A method of making friction material suitable for clutch facings, brake linings and the like, which comprises intimately mixing and shaping into the form of a friction element a composition comprising essentially asbestos and particles of iron, and thereafter subjecting said shaped element, to the action of air and water to substantially completely corrode the iron constituent thereof. 13. A method of making friction material suitable for clutch facings, brake linings and the like, which comprises intimately mixing and shaping into the form of a friction element a composition comprising essentially asbestos and particles of metallic iron, and thereafter subjecting said element to treatment with a solution of an electrolyte in the presence of an oxygen source to substantially completely convert the iron to its oxidation products. 14. A method of making friction material suitable for clutch facings, brake linings and the like, which comprises intimately mixing and shaping into the form of a friction element a composition comprising essentially asbestos and particles of metallic iron, subjecting said shaped element to the action of air and water, and thereafter treating it with an electrolyte in an ionizing solvent and in the presence of an oxygen source to substantially completely convert said iron in situ to its oxidation products. 15. A method of making a friction element which comprises intimately mixing a composition comprising in major proportions by weight fibrous asbestos and finely divided particles of iron, shaping said composition into the form of an element, and thereafter inducing oxidation to substantially completely convert said iron to its oxides in situ said shaped element and to become the essential binder thereof. 16. A method of making a friction element which comprises dry mixing a composition comprising essentially fibrous asbestos and powdered iron, adding water to said mixture, and shaping in the form of an element, exposing said shaped element to air to permit oxidation of said iron particles to take place, and thereafter subjecting the element to the action of an oxidizing reagent to substantially completely convert the iron to its oxidation products and to form the essential binder of said element. 17. A method of making a friction element which comprises dry mixing a composition comprising essentially fibrous asbestos and powdered iron, adding water to said mixture, and shaping in the form of an element, exposing said shaped element to air to permit oxidation of said iron particles to take place, impregnating it with an aqueous solution of an electrolyte, and thereafter subjecting it to the action of steam and air under pressure to substantially completely convert the iron to its oxidation products and to form the essential binder of said element. 18. A method of making a friction element which comprises dry mixing a composition comprising major proportions by weight of fibrous asbestos and powdered iron and minor proportions of graphite and sulphur, forming an aqueous slurry of said mixture, shaping a friction element therefrom, permitting the shaped element while retaining water to be exposed to air to permit free corrosion cure of the iron particles to take place, expelling residual moisture therefrom, impregnating it with an aqueous solution of an electrolyte and subjecting it to the action of air and steam under pressure to substantially completely convert the iron to its oxidation products, and thereafter heat treating the element to combine residual free iron and sulphur. 19. A method of making a friction element which comprises dry mixing a composition comprising major proportions by weight of fibrous asbestos and powdered iron and a minor proportion of an auxiliary binder having molding characteristics, molding an element therefrom under mild heat and pressure, and thereafter treating said molded element with an aqueous solution of an electrolyte in the presence of air to substantially convert the iron to its oxides and to form a predominant binder constituent of said element. 20. A method, of making a friction element which comprises dry mixing a composition comprising major proportions by weight of fibrous asbestos and powdered iron and a minor proportion of an auxiliary organic binder, shaping said composition in the form of an element by molding under mild heat and pressure, and thereafter treating said molded element with an aqueous solution of an electrolyte in the presence of air to substantially convert the iron to its oxides and to form a predominant binder constituent of said element. 21. A method of making a friction element which comprises dry-mixing a composition comprising major proportions by weight of fibrous asbestos and powdered iron and a minor proportion of a thermo-plastic thermo-setting auxiliary binder, molding an element from said composition under mild heat and pressure, treating said molded element with an electrolyte in an ionizing solvent in the presence of an oxygen source to substantially convert the iron to its oxides and to form the predominant binder constituent of said element, and thereafter subjecting said element to heat to cure said auxiliary binder, 22. A method of making a friction element which comprises dry-mixing a composition comprising major proportions by weight of fibrous asbestos and powdered iron and minor proportions of graphite, sulphur and a heat curable auxiliary binder having molding characteristics, shaping an element therefrom by molding under mild heat and pressure, treating said shaped element with a water solution of an electrolyte in the presence of air to substantially convert the iron to its oxides and to form the major binder constituent of said element, and thereafter subjecting said element to heat to cure said auxiliary binder and to combine residual free iron with sulphur.

Classifications:
International (IPC 8-9): F16D69/02 (Advanced/Invention);
F16D69/02 (Core/Invention)
International (IPC 1-7): B61H1/00 C08L75/04
CPC: F16D69/022
European: F16D69/02A2
US: 106/282 106/283 106/36

Family:

Publication number	Publication date	Application number	Application date
US2252991 A	19410819	US19390304118	19391113

Priority:
US19390304118 19391113

Probable Assignee: RAYBESTOS MANHATTAN INC
Assignee(s): (std): RAYBESTOS MANHATTAN INC
Inventor(s): (std): EDWARD STECK RUDOLPH
Inventor(s): STECK RUDOLPH EDWARD

Title: Improvements in or relating to friction compositions for use in clutch and brake devices

Abstract: Source: GB740820A A friction composition comprises mullite and a metal, the mixture being heat treated so that the metal is sintered whereby it serves as a binder for the mullite. The mullite may be produced by fusing alumina and silica together in an electric furnace in appropriate stoichiometric proportions or by calcining certain naturally occurring aluminium silicates such as kyanite, sillimanite and andalusite. The binder may be a metallic matrix having a plurality of pores distributed throughout its mass, with the particles of synthetic mullite disposed in the pores. Preferred proportions are 1-55 per cent synthetic mullite, in the form of calcined kyanite, 16-86 per cent copper, 1-38 per cent iron, 1-41 per cent finely divided zinc and/or tin, 1-19 per cent graphite, 1-20 per cent of finely divided quartz, and 1-20 per cent lead. Nickel and brass may replace the copper. A typical percentage composition is:-Calcined kyanite 26, brass chips 29, copper-lead 39, quartz 5, graphite 1: the mixture is then sintered under pressure. Specification 606,786, [Group XXXIV], is referred to.

Classifications:

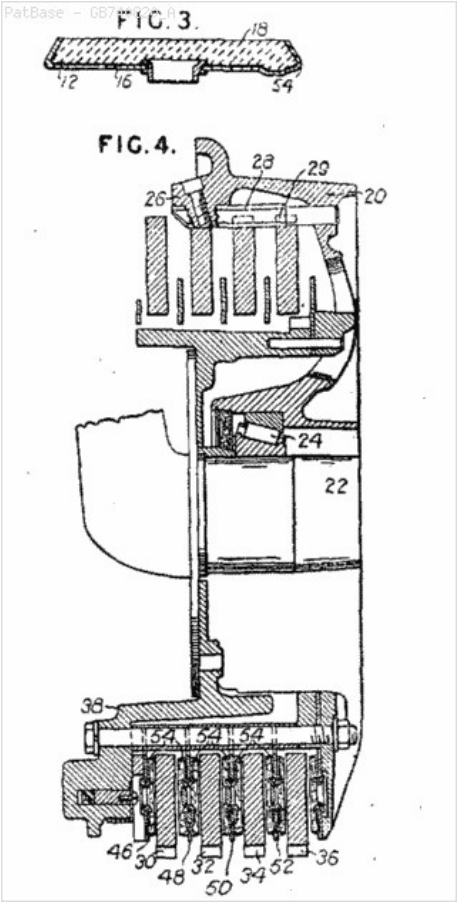
International (IPC 8-9): F16D13/64 F16D69/02 (Advanced/Invention);

F16D13/64 F16D69/02 (Core/Invention)

International (IPC 1-7): F16D43/00

CPC: F16D13/648 F16D69/027

European: F16D13/64C F16D69/02E



Family:

Publication number	Publication date	Application number	Application date
GB740820 A	19551123	GB19520028290	19521110

Priority:

19511119

Probable Assignee: BENDIX AVIAT CORP

Assignee(s): (std) BENDIX AVIAT CORP

Assignee(s): BENDIX AVIATION CORP

Title: FRICTION ELEMENTS

Abstract: Source: US2966737A (Claim 1) 1. A friction couple member comprising a rigid metal-lic supporting member and a friction element for high energy applications secured thereto, said friction element consisting essentially of a thermally stable heatconductive metallic matrix having dispersed therein bodies of aluminum silicate mineral consisting essentially only of highly angular naturally occurring substantially pure sillimanite, each such body being an agglomeration of parallel to sub-parallel interlaced substantially pure sillimanite crystals having the formula Al_2SiO_5 , a hardness of 6-7, a specific gravity of about 3.10 to 3.23, crystallizing in the orthorhombic system, and heat stable up to temperatures at least as high as about 1550° C.

Classifications:

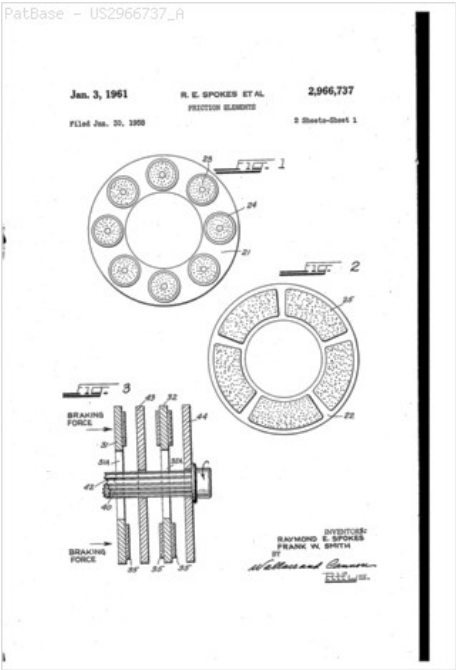
International (IPC 8-9): F16D69/02 (Advanced/Invention);
F16D69/02 (Core/Invention)

International (IPC 1-7): F16D65/12 F16D69/02

CPC: F16D69/027 Y10T428/12139 Y10T428/12243 Y10T428/12396

European: F16D69/02E

US: 106/36 188/251M 192/107M 192/107R 428/564 428/579 428/601 75/232 75/243



Family:

Publication number	Publication date	Application number	Application date
US2966737 A	19610103	US19580712234	19580130

Priority:

US19580712234 19580130

Probable Assignee: AMERICAN BRAKE SHOE CO

Assignee(s): (std): AMERICAN BRAKE SHOE CO

Assignee(s): AMERICAN BRAKE SHOE COMPANY

Inventor(s): (std): SPOKES RAYMOND E ; SMITH FRANK W

Title: Improvements in or relating to friction bodies

Abstract: Source: GB906358A Ceramic friction bodies, e.g. for brakes or couplings are manufactured by plastifying a dry mixture including by weight, 20 to 50 parts of fibres, e.g. asbestos, wool, slag wool, sillimanite wool, 20 to 50 parts of a glass frit, e.g. comprising borates and/or silicates and/or phosphates, 10 to 40 parts of a powder mixture metal and/or a metal oxide powder mixture 1 e.g. one or more of iron, copper, zinc, brass and bronze, or the oxides of titanium, antimony, zinc, tin and lead and 0 to 15 parts of powdered graphite and/or a powdered sulphide or nitride, and pressing the plastified mixture into shaped bodies at a pressure of the order of 1000 atmospheres thereafter drying them at approximately 200 DEG C. and firing in air at between 550 DEG C. to 650 DEG C. If desired, pressing and firing may be effected simultaneously, and a plastifying agent e.g. aluminium hydrosilicate bentonite, may be added to the mix beforehand.

Classifications:

International (IPC 8-9): C04B30/02 F16D69/02 (Advanced/Invention);

C04B30/00 F16D69/02 (Core/Invention)

International (IPC 1-7): C0431/02 C04B31/04 C04B35/00 C04B43/02 F16D69/00 F16D69/02

CPC: C04B30/02 F16D69/02 F16D69/022 F16D69/028 F16D2200/0043

European: C04B30/02 F16D69/02 F16D69/02A2 F16D69/02E2 R16D200/00D2B

Family:

Publication number	Publication date	Application number	Application date
AT225598 B	19630125	AT19600008114	19601031
AT234572 B	19640710	AT19610005772	19610726
AT244212 B	19651227	AT19610005785	19610727
CH378764 A	19640615	CH19600012765	19601115
CH415419 A	19660615	CH19610008835	19610727
CH437936 A	19670615	CH19610009537	19610814
DE1150918 B	19630627	DE1960ST16099	19600210
DE1153670 B	19630829	DE1960ST17101	19601111
DE1164305 B	19640227	DE1960ST17096	19601110
GB906358 A	19620919	GB19610003660	19610131
GB995197 A	19650616	GB19610040346	19611110
GB995198 A	19650616	GB19610040347	19611110
SE305779 B	19681104	SE19610010780	19611030
SE305780 B	19681104	SE19610010781	19611030

Priority:

DE1960ST16099 19600210 DE1960ST17096 19601110 DE1960ST17101 19601111

Probable Assignee: STEATIT MAGNESIA AG

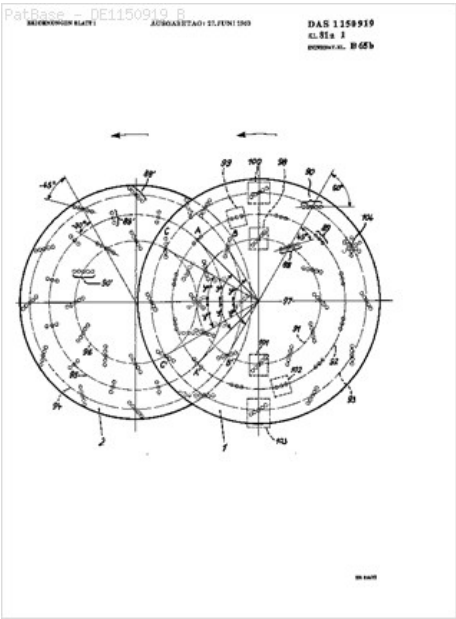
Assignee(s): (std): STEATIT MAGNESIA AG

Assignee(s): STEATIT MAGNESIA AKTIENGESELLS ; STEATIT MAGNESIA AKTIENGESELLSCHAFT

Inventor(s): (std): HERMANN HOEPPLI ; HOEPPLI H ; HOEPPLI HERMANN ; LABURDA V ; LABURDA VIKTOR ; VIKTOR LABURDA

Title: Fuell- und Schliessmaschine fuer zweiteilige Kapseln

Classifications:
International (IPC 8-9): A61J3/07 (Advanced/Invention);
A61J3/07 (Core/Invention)
International (IPC 1-7): F16D69/02
CPC: A61J3/074
European: A61J3/07B2



Family:

Publication number	Publication date	Application number	Application date
DE1150919 B	19630627	DE1962H044680	19620122

Priority:

DE1962H044680 19620122

Probable Assignee: HOEFLIGER AND KARG

Assignee(s): (std): HOEFLIGER AND KARG

Inventor(s): (std): WOLF DR ING OTTO

Title: Friction material

Abstract: Source: US3402054A A friction material comprises asbestos or other inorganic fibre and a binder which is wholly or substantially wholly composed of copper sulphide formed in situ by reaction of sulphur with copper powder or with cuprous sulphide. The mixture may be cured at 80 DEG to 220 DEG C. and 2 to 20 tons/sq. in. Optional additives include graphite, silica, alumina, barytes, metallic powders and antioxidants; excess copper or sulphur may also be present.

Classifications:

International (IPC 8-9): C04B28/36 F16D69/02 (Advanced/Invention);
C04B28/00 F16D69/02 (Core/Invention)

International (IPC 1-7): C04B29/02 C04B35/00 C09K3/14 F16D69/02

CPC: F16D69/022 C04B28/36 F16D69/028

European: C04B28/36 F16D69/02 F16D69/02A2 F16D69/02E2

US: 106/286 106/36 264/332

Family:

Publication number	Publication date	Application number	Application date
DE1571467 B1	19700806	DE1965F043381	19651129
DE1771328 A1	19720217	DE19681771328	19680508
FR1457036 A	19661028	FR19650039710	19651125
FR94766 E	19691121	FR19680151658	19680514
GB1071520 A	19670607	GB19640048670	19641130
GB1156058 A	19690625	GB19670022463	19670515
US3402054 A	19680917	US19650510373	19651129
US3660120 A	19720502	US19680728892	19680514

Priority:

GB19640048670 19641130 GB19670022463 19670515

Probable Assignee: FERODO LTD

Assignee(s): (std): FERODO LTD ; FERODO SA

Assignee(s): SOCIETE ANONYME FRANCAISE DU FERODO ; ANONYME FRANCAISE DU FERODO SOC ; FERODO LIMITED

Inventor(s): (std): CLARK ERIC ; ERIC CLARK ; FRANK WOOD ; NEWTON ERIC CLARK ; WOOD FRANK ; SUMMERLING ROGER ADRIAN ; SUMERLING ROGER ADRIAN ; ADRIAN SUMERLING ROGER

Inventor(s): ROGER ADRIAN SUMMERLING ; ROGER ADRIAN SUMERLING ; MILLS NEW ; CLARK NEWTON ERIC

Title: FRICTION MATERIALS

Abstract: Source: US3723382A A friction material for friction braking or transmission systems including in its finished state a two-part binder system, one part being a phenolic thermosetting resin and the other part being uncombined nickel and sulphur. The nickel and sulphur are capable of reacting together under the action of heat generated during application of the system to form nickel sulphide which provides additional binding in the material and compensates for thermal decomposition of the resin. Friction modifiers and fillers may also be included.

Classifications:

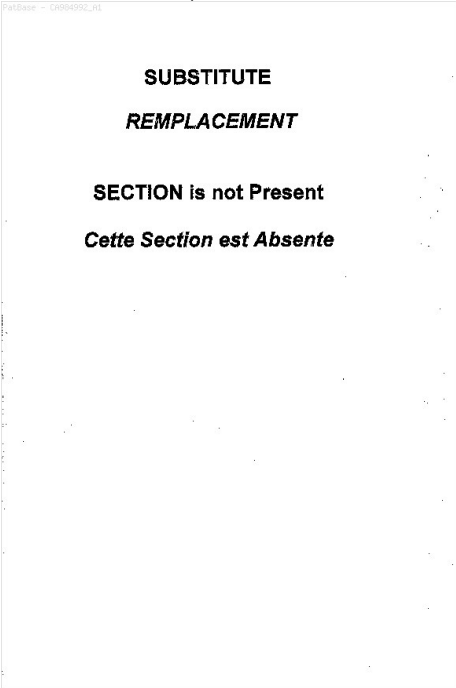
International (IPC 8-9): C08J5/14 C08L61/10 C09K3/14 F16D69/02 (Advanced/Invention); C08J5/14 C08L61/00 C09K3/14 F16D69/02 (Core/Invention)

International (IPC 1-7): B22F3/14 B29B1/14 B60S C04B31/16 C08G37/08 C08G51/04 C08G51/10 C08G51/12 C08J5/14 C08L61/10 F16D69/00 F16D69/02

CPC: F16D69/022 F16D69/02 F16D69/025

European: F16D69/02 F16D69/02A2 F16D69/02D

US: 106/36 260/38 523/159 524/410 524/420 524/440 524/80



Family:

Publication number	Publication date	Application number	Application date
AR202089 A1	19750515	AR19720245375	19721129
AU197249389 A1	19740530	AU19720049389	19721129
AU465670 B2	19751002	AU19720049389	19721129
CA984992 A1	19760302	CA19720157631	19721128
DE2117991 A1	19711028	DE19712117991	19710414
DE2117991 C2	19811001	DE19712117991	19710414
DE2258081 A1	19730530	DE19722258081	19721127
DE2258081 C2	19820701	DE19722258081	19721127
ES390222 A1	19740601	ES19710390222	19710415
ES409112 A1	19760401	ES19720409112	19721129
FR2089606 A5	19720107	FR19710013056	19710414
FR2163125 A6	19730720	FR19720042176	19721128
GB1287817 A	19720906	GB19700017965	19700415
GB1322866 A	19730711	GB19710055315	19711129
IT1045249 A	19800510	IT19720070740	19721128
JP48063907 A2	19730905	JP19720119750	19721128
SE379496 B	19751013	SE19710004715	19710413
SE379496 C	19760122	SE19710004715	19710413
US3723382 A	19730327	US19710133765	19710413
US3842031 A	19741015	US19720310001	19721128

Priority:

GB19700017965 19700415 GB19700046434 19700930 US19710133765 19710413

US19720310001 19721128 GB19710055315 19711129

Probable Assignee: BBA GROUP LTD

Assignee(s): (std): BBA GROUP LTD

Assignee(s): BBA GROUP LTD CLECKHEATON YORKSHIRE GB ; BBA GROUP LTD CLECKHEATON YORKSHIRE GROSSBRITANNI ; BBA GROUP LTD CLECKHEATON YORKSHIRE GROSSBRITANNIEN ; BBA GROUP LTD GB ; EDWARDS MICHAEL ; LUMB JOHN B ; BBA GROUP LIMITED

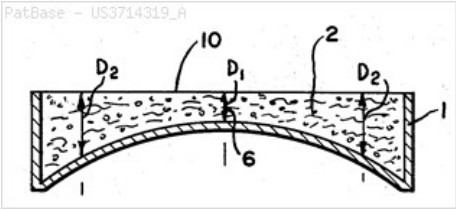
Inventor(s): (std): EDWARDS MICHAEL ; EDWARDS M ; LUMB J ; LUMB J B ; LUMB JOHN B ; LUMB JOHN BERNARD

Inventor(s): LUMB JOHN BERNARD BRADFORD ; LUMB JOHN BERNARD BRADFORD GB ; LUMB JOHN BERNARD OAKENSHAW BRADFORD GB ; MICHAEL EDWARDS ; LUMB J GB ; EDWARDS M GB ; EDWARDS MICHAEL LEEDS ; EDWARDS MICHAEL LEEDS GB ; JOHN BERNARD LUMB

Title: PROCESS FOR MAKING SEMI-METALLIC ARCUATE BRAKE LINING SEGMENTS

Abstract: Source: US3714319A A process for making semi-metallic arcuate brake lining segments from graphite, metal powder, fibrous materials (asbestos and steel wool) and a phenolformaldehyde resin binder, by placing the materials in a specially designed pan and then heating the materials to a temperature between the cure and flow temperature of the resin before die pressing and curing the material to a predetermined arcuate configuration.

Classifications:
International (IPC 8-9): F16D69/02 (Advanced/Invention); F16D69/02 (Core/Invention)
International (IPC 1-7): B22F1/00 B22F3/12 B22F5/00 B29B1/04 B29B1/14 B29C3/00 B29D31/00 F16C F16D13/64 F16D65/12 F16D69/00 F16D69/02
CPC: F16D69/021 F16D69/026
European: F16D69/02A F16D69/02D2
US: 264/119 264/236 264/294 264/325



Family:

Publication number	Publication date	Application number	Application date
AU197239802 A1	19730913	AU19720039802	19720308
AU460845 B2	19750422	AU19720039802	19720308
DE2210950 A1	19720921	DE19722210950	19720307
ES400631 A1	19750116	ES19720400631	19720310
FR2127851 A5	19721013	FR19720006768	19720229
GB1329676 A	19730912	GB19720007232	19720216
JP54029964 B4	19790927	JP19720023645	19720309
US3714319 A	19730130		19710310

Priority:
US19710122845 19710310 AU19720039802 19720308

Probable Assignee: BENDIX CORP

Assignee(s): (std): BENDIX CORP

Assignee(s): BENDIX CORP US

Inventor(s): (std): KWOLEK J ; KWOLEK JOHN P

Inventor(s): JOHN P KWOLEK ; KWOLEK J US

Title: SPONGE IRON FRICTION MATERIAL

Abstract: Source: US3835118A A semi-metallic friction material for use in a vehicle brake as a friction lining or pad. The semi-metallic friction material utilizes the abrasive surface produced in coarse sponge iron to provide a high coefficient of friction and good wear resistance up to 250 DEG F to compliment the coefficient of friction and wear resistance capable of being produced by the interaction of metallic and ceramic powders, steel fibers, rubber particles and graphite above 250 DEG F.

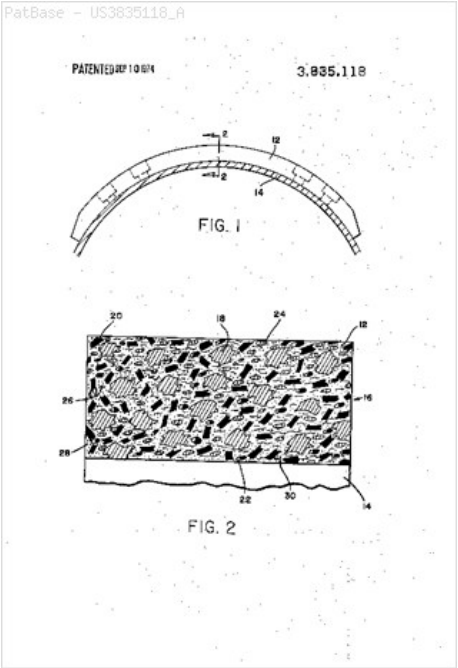
Classifications:

International (IPC 8-9): C08J5/14 C08K3/08 F16D69/02 (Advanced/Invention)
International (IPC 1-7): C08G51/08 C08K3/22 F16D69/02

CPC: C08K3/08 F16D69/02

European: C08K3/08 F16D69/02

US: 106/36 106/403 451/367 51/298 523/155 523/156 524/431 524/432 524/435 524/440



Family:

Publication number	Publication date	Application number	Application date
IT1012282 A	19770310	IT19740022605	19740513
US3835118 A	19740910	US19730360255	19730514
US3835118 B1	19870310	US19730360255	19730514

Priority:

US19730360255 19730514

Probable Assignee: ALLIED CORP

Assignee(s): (std): BENDIX CORP

Assignee(s): BENDIX CORP US ; THE BENDIX CORP ; ALLIED CORP

Inventor(s): (std): JOHN P KWOLEK ; KWOLEK JOHN P ; RHEE SEONG K ; SEONG K RHEE ; RHEE S ; KWOLEK J

Inventor(s): RHEE S US ; KWOLEK J US

Title: FRICTION FACINGS FOR CLUTCHES AND BRAKES

Abstract: Source: FR2359323A Suivant ce procede, on forme une pate en matiere de friction contenant un ciment durcissable et une proportion substantielle de charge fibreuse, on extrude la pate et on enroule en spirale le produit d'extrusion pour obtenir une ebauche en forme de disque, et on moule et durcit l'ebauche pour obtenir une garniture de friction circulaire, la charge fibreuse comportant des brins discontinus de fibres orientes, lors de l'extrusion, suivant l'axe longitudinal du produit d'extrusion.

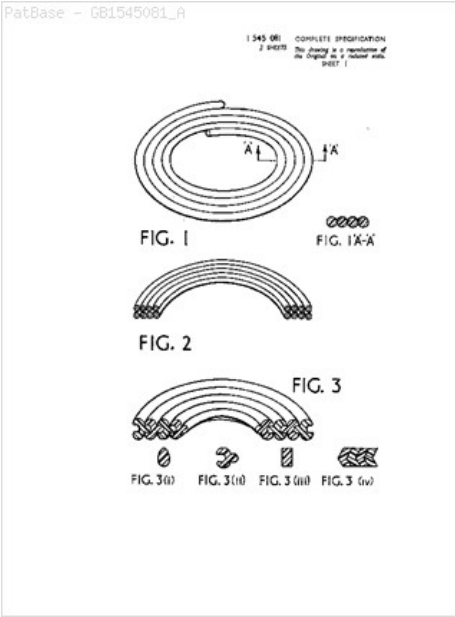
Classifications:

International (IPC 8-9): C08J5/14 F16D69/00 F16D69/02 (Advanced/Invention); C08J5/14 F16D69/00 F16D69/02 (Core/Invention)

International (IPC 1-7): B28B1/52 B29D3/02 B60T17/00 C08J5/14 F16D69/00 F16D69/02 G12B3/06

CPC: F16D69/022 F16D69/026

European: F16D69/02A2 F16D69/02D2



Family:

Publication number	Publication date	Application number	Application date
AT373371 B	19840110	AT19770005035	19770713
AT503577 A	19830515	AT19770005035	19770713
BR7704721 A	19780328	BR19770004721	19770718
CA1091876 A1	19801223	CA19770281025	19770621
DE2731813 A1	19780126	DE19772731813	19770714
ES460967 A1	19780716	ES19770460967	19770722
FR2359323 A1	19780217	FR19770022408	19770721
FR2359323 B1	19810717	FR19770022408	19770721
GB1545081 A	19790502	GB19760030515	19760722
IN145693 A	19790421	IN1977CA00931	19770622
IT1083664 A	19850525	IT19770068628	19770713
JP53013048 A2	19780206	JP19770086769	19770721

Priority:

GB19760030515 19760722 CA19770281025 19770621

Probable Assignee: AUTOMOTIVE PROD CO LTD

Assignee(s): (std): AUTOMOTIVE PROD CO LTD

Assignee(s): AUTOMOTIVE PROD LTD ; AUTOMOTIVE PRODUCTS LIMITED ; AUTOMOTIVE PRODUCTS LTD ; MCCOMBIE ERNEST H ; AUTOMATIVE PRODUCTS LTD

Inventor(s): (std): MCCOMBIE E ; MCCOMBIE E H ; MCCOMBIE ERNEST H ; MCCOMBIE ERNEST HUGHES ; AANESUTO HIYUUZU MATSUKONBII

Inventor(s): HUGHES MCCOMBIE ERNEST

Agent(s): FETHERSTONHAUGH AND CO

Title: Sintered iron-based friction material

Abstract: Source: US4311524A According to the invention, a sintered iron-based friction material comprises copper, tin, graphite, pyroceramic, lead, and zinc sulphide, the ratio of the components expressed in percent by mass being as follows: copper: 1.5 to 3.0 tin: 1.0 to 2.0 zinc sulphide: 2.0 to 4.0 graphite: 6.0 to 10.0 pyroceramic: 2.0 to 5.0 lead: 10.0 to 20.0 the balance being iron.

Classifications:
International (IPC 8-9): C22C33/02 F16D69/02 (Advanced/Invention);
C22C33/02 F16D69/02 (Core/Invention)
International (IPC 1-7): B22F3/00 C09K3/14 C09K3/18
CPC: C22C33/0228 F16D69/027
European: C22C33/02A6 F16D69/02E
US: 106/36 188/251A 188/251M 192/107M 75/231 75/232 75/244 75/246

PatBase - GB2073782 B2			
copper	1.5 to 3.0	graphite	6.0 to 10.0
tin	1.0 to 2.0	pyroceramic	2.0 to 5.0
zinc sulphide	2.0 to 4.0	lead	10.0 to 20.0
		iron	balance.

Family:

Publication number	Publication date	Application number	Application date
GB2073782 A1	19811021	GB19800011408	19800403
GB2073782 B2	19830608	GB19800011408	19800403
US4311524 A	19820119	US19800136304	19800401

Priority:
US19800136304 19800401 GB19800011408 19800403

Probable Assignee: NII PROSHKOVOI METAL BELORUS P

Assignee(s): (std): DMITROVICH ALEXANDR A ; FISHBEIN EFIM I ; GENKIN VALERY A ; NII PROSHKOVOI METAL BELORUS P

Assignee(s): NI INST PROSHKOVOI METAL BELORUS POLITEKHNI INST

Inventor(s): (std): DMITROVICH ALEXANDR A ; FISHBEIN EFIM I ; GENKIN VALERY A

Title: FRICTION MATERIAL CONTAINING BRASS POWDERS

Abstract: Source: US5324592A A copper powder-free friction material which is made by sintering and intended for friction surfaces of couplings or brakes contains powdery and/or granular metallic and non-metallic components, at least 50 percent by weight of the non-ferrous heavy metal component being brass powder.

Classifications:

International (IPC 8-9): B22F7/00 C22C9/00 F16D13/62 F16D69/02 (Advanced/Invention);
B22F7/00 C22C9/00 F16D13/60 F16D69/02 (Core/Invention)

International (IPC 1-7): B22F5/00 B22F7/00 C09K3/14 C22C9/00 F16D13/62 F16D69/02

CPC: Y10T428/12028 Y10T428/12049 Y10T428/12056 Y10T428/12063 Y10T428/12139 Y10T428/12146 F16D69/027

European: F16D69/02E

US: 428/548 428/551 428/552 428/553 428/564 428/565 75/245 75/246 75/247

Family:

Publication number	Publication date	Application number	Application date
AT411765 B	20040525	AT19910000624	19910320
AT62491 A	19930715	AT19910000624	19910320
DE59202583 D1	19950727	DE19925002583	19920219
EP0505345 A2	19920923	EP19920890042	19920219
EP0505345 A3	19930303	EP19920890042	19920219
EP0505345 B1	19950621	EP19920890042	19920219
EP0505345 B2	19971001	EP19920890042	19920219
JP5187469 A2	19930727	JP19920064016	19920319
US5324592 A	19940628	US19920854885	19920320

Priority:

AT19910000624 19910320

Probable Assignee: HOERBIGER ANTRIEBSTECHNIK GMBH

Assignee(s): (std): HOERBIGER AND CO ; HOERBIGER GMBH

Assignee(s): HERUBIGAA BETEIL GMBH ; HOERBIGER ANTRIEBSTECHNIK GMBH ; HOERBIGER AND CO 86956 SCHONGAU DE ;
HOERBIGER AND CO A CORP OF GERMANY

Inventor(s): (std): BLANKENHAGEN FRED ; BLANKENHAGEN FRED ING ; PUETZ HERMANN ; PUETZ HERMANN ING ; HERUMAN PIYUTSUTSU ;
FURETSUDO BURANKENHAAGEN

Inventor(s): BLANKENHAGEN FRED ING W 8122 PENZBERG DE ; PUETZ HERMANN ING W 8920 SCHONGAU DE

Designated states: DE FR GB IT

Title: ADDITIVE FOR FRICTION LINING MIXTURES AND FRICTION LININGS PRODUCED THEREWITH

Abstract: The invention concerns an additive for friction lining mixtures, in particular for resin-bonded friction linings. The additive consists of a mixture of ferrous sulphide with a molybdenum and/or zinc and/or antimony and/or tungsten and/or titanium sulphide. The invention further concerns friction linings, in particular resin-bonded friction linings, containing such an additive.

Classifications:

International (IPC 8-9): C08J5/14 F16D69/02 (Advanced/Invention)

International (IPC 1-7): C08J5/14 C08K3/30 F16D69/02

CPC: F16D69/026 F16D69/025

European: F16D69/02D F16D69/02D2

Family:

Publication number	Publication date	Application number	Application date
AT400718 B	19960325	AT19940000567	19940317
AT56794 A	19950715	AT19940000567	19940317
WO9525231 A1	19950921	WO1995AT00046	19950313

Priority:

AT19940000567 19940317

Probable Assignee: CHEMSON POLYMER ADDITIVE

Assignee(s): (std): DRUCKER PETER ; GERINGER MICHAEL ; KOECK PETER ; WEBER JOSEF ; KIENTLEITNER HERBERT ; CHEMSON POLYMER ADDITIVE

Assignee(s): CHEMSON POLYMER ADDITIVE GESELLSCHAFT M B H

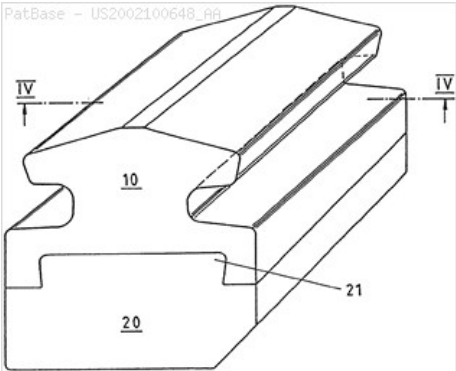
Inventor(s): (std): DRUCKER PETER ING ; GERINGER MICHAEL DR ; KIENTLEITNER HERBERT ; KOECK PETER ; WEBER JOSEF ING ; WEBER JOSEF ; GERINGER MICHAEL ; DRUCKER PETER

Designated states: AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE US

Title: Sintered material for a magnetic track brake

Abstract: Source: US2002100648A The invention relates to a sintered material as friction material for a pole shoe, a pole shoe area or at least an area of the pole shoe friction surface of a magnetic track brake (300), more particularly an eddy current brake and/or magnetic track brake with a magnetic basic and/or carrier member.

Classifications:
International (IPC 8-9): B22F5/00 B22F7/00 B61H7/00 B61H7/08 C09K3/14 C22C38/00 F16D65/092 F16D65/14 F16D69/00 F16D69/02 F16D69/04 (Advanced/Invention); B61H7/00 F16D65/092 F16D65/14 F16D69/00 (Core/Invention)
International (IPC 1-7): B22F7/00 B61H7/00 B61H7/08 C09K3/14 C22C38/00 F16D65/092 F16D69/00 F16D69/02 F16D69/04 H01F1/047
CPC: B61H7/08 F16D69/04 F16D2069/0441 F16D2069/0458 F16D2069/0466 F16D2069/0483 F16D2121/20
European: B61H7/08 F16D69/04 R16D121/20 R16D69/04F4 R16D69/04F6B R16D69/04F6D R16D69/04F8
US: 188/165 188/251 188/251.00AP 188/251.00RS 188/251A 188/251R



Family:

Publication number	Publication date	Application number	Application date
AT270398 E	20040715	AT19980101858T	19980204
DE29707550 U1	19980827	DE19972007550U	19970428
DE59811614 D1	20040805	DE19985011614	19980204
DK0875691 T3	20040906	DK19980101858T	19980204
EP0875691 A1	19981104	EP19980101858	19980204
EP0875691 B1	20040630	EP19980101858	19980204
ES2221082 T3	20041216	ES19980101858T	19980204
JP11078882 A2	19990323	JP19980119656	19980428
JP4518580 B2	20100804	JP19980119656	19980428
US2002100648 AA	20020801	US20020056385	20020124
US6364072 BA	20020402	US19980067371	19980427
US6648108 BB	20031118	US20020056385	20020124

Priority:

DE19972007550U 19970428 DE19985011614 19980204 EP19980101858 19980204
US20020056385 20020124 US19980067371 19980427

Probable Assignee: HONEYWELL BREMSBELAG GMBH

Assignee(s): (std): HONEYWELL BREMSBELAG GMBH ; JURID WERKE GMBH ; KNORR BREMSE SYSTEME ; KNORR BREMSE SYST F SCHIENE ; KNORR BREMSESYSTEME F SCHIE ; KNORR BREMSE SYST FUER SCHIENE ; KNORR BREMSESYSTEME FUER SCHIE ; SAUMWEBER ECKART ; SCHROER WOLFGANG

Assignee(s): KNORR BREMSE SYSTEME FUER SCHIENENFAHRZEUGE GMBH 80809 MUENCHEN DE ; KNORR BREMSE SYSTEME F SCHIENENFAHRZEUGE GMBH ; KROGER UWE ; VALENTIH WOLFGANG ; ALLIEDSIGNAL BREMSBELAG GMBH ; ALLIEDSIGNAL BREMSBELAG GMBH 21509 GLINDE DE ; GRUPP FRIEDEMANN ; KNORR BREMSE SYSTEME FUER SCHIENENFAHRZEUGE GMBH ; KNORR BREMSESYSTEME FUER SCHIENENFAHRZEUGE GMBH ; KNORR BREMSE SYSTEME FUER SCHIENENFAHRZEUGE GMBH ; KNORR BREMSE SYST FUER SCHIENENFAHRZEUGE GMBH ; KNORR BREMSE SYSTEME FUER SCHIENENFAHRZEUGE GMBH 8

Inventor(s): (std): GRUPP FRIEDEMANN ; KROEGER UWE ; KROGER UWE ; SAUMWEBER DR ; SAUMWEBER ECKART ; SAUMWEBER ECKART DR ; SCHROEER DR ING ; SCHROEER WOLFGANG ; SCHROEER WOLFGANG DR ING ; SCHROER WOLFGANG ; SCHROER WOLFGANG DR ING ; VALENTIH WOLFGANG ; VALENTIN WOLFGANG

Designated states: AT BE CH DE DK ES FI FR LI NL SE

Title: Friction material and method of producing the same

Abstract: Source: US6423668B A friction material exhibiting a great coefficient of friction, as compared to that of the conventional friction material, which is produced with the use of an organic paper-like substrate. The friction material is composed of the paper-like substrate of a fibrous material, and an inorganic binder with which said substrate is impregnated. When friction is produced, the inorganic binder exhibits friction characteristics so that a great coefficient of friction can be effected, as compared to the cases organic binders such as phenol resin are used.

Classifications:

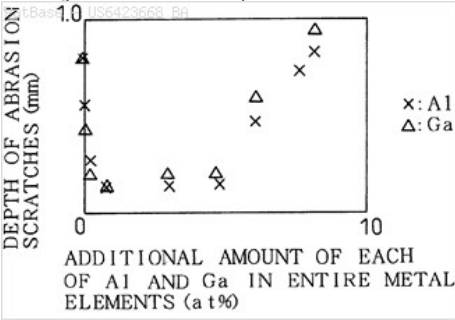
International (IPC 8-9): C08J5/14 C09K3/14 D21H19/10 D21H19/12 F16D13/62 F16D69/02 (Advanced/Invention); C08J5/14 C09K3/14 D21H19/00 F16D13/60 F16D69/02 (Core/Invention)

International (IPC 1-7): C08J5/14 C09K3/14 C10M125/10 D21H19/10 D21H19/12 F16D13/62 F16D69/02

CPC: F16D69/028

European: F16D69/02E2

US: 106/36 508/101 508/107 508/108 523/149 523/155



Family:

Publication number	Publication date	Application number	Application date
JP11246846 A2	19990914	JP19980331368	19981120
US6423668 BA	20020723	US19980207684	19981209

Priority:
JP19970342674 19971212 JP19980331368 19981120

Probable Assignee: TOYOTA JIDOSHA KK

Assignee(s): (std): TOYOTA MOTOR CO LTD ; TOYOTA MOTOR CORP

Assignee(s): TOYOTA JIDOSHA KABUSHIKI KAISHA ; TOYOTA JIDOSHA KK

Inventor(s): (std): KAWABATA MASATAKA ; NAKANISHI MASAJI ; NAKANISHI MASATSUGU ; SHIRASAWA ATSUSHI ; SUZUKI ATSUSHI